

Vaccine hesitancy among Maltese Healthcare workers *vis-à-vis* influenza and COVID-19 vaccination

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INTRODUCTION

Vaccine hesitancy is a chronic public health threat. This study was carried out to ascertain Maltese healthcare workers' hesitancy to COVID-19 vaccination and correlate this with influenza vaccine uptake.

METHODS

A short, anonymous questionnaire was sent out to all of Malta's government sector healthcare workers via the service's standard email services (11-19/09/2020). A total of 9,681 questionnaires were posted electronically, with 10.4% response.

RESULTS

The proportion of Maltese healthcare workers who "will take" the influenza vaccine increased significantly. Doctors had the highest baseline uptake and highest likely influenza vaccine uptake next winter. The likely/undecided/unlikely to take a COVID-19 vaccine were 52/22/26% respectively. Males were likelier to take the vaccine. Doctors had the highest projected likelihood to take vaccines. Likelihood of taking COVID-19 vaccine was directly related to the likelihood of influenza vaccination. Concerns raised were related to insufficient knowledge about such a novel vaccine, especially unknown long term side effects.

DISCUSSION

The anticipated increased uptake of influenza vaccine is probably due to increased awareness of respiratory viral illness. Doctors may have higher vaccine uptakes due to greater awareness and knowledge of vaccine safety. The proportions of who are likely/undecided/unlikely (half, quarter, quarter respectively) to take a COVID-19 are similar to rates reported in other countries. The higher male inclination to take the vaccine may be due the innate male propensity for perceived risk taking. Shared COVID-19 with influenza vaccine hesitancy implies an innate degree of vaccine reluctance/hesitancy and not merely reluctance based on novel vaccine knowledge gap.

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INTRODUCTION

Hospital-acquired influenza has a high mortality, with an estimated median of 16% that rises up to 60% in high risk groups (e.g. transplant recipients and intensive care patients).^{1,2} Healthcare workers who carry the influenza virus have been frequently identified as sources of hospital-acquired outbreaks.³ Annual influenza vaccination is strongly recommended for all healthcare workers,⁴ but vaccination rates remain poor,⁵ despite models that show that a significant proportion of hospital-acquired burden of disease is vaccine preventable.⁶

COVID-19 vaccine development has accelerated at an unprecedented pace.⁷ It was announced that in Malta, frontliners (including all healthcare workers) would be given first priority for the first batch of vaccines.⁸

An earlier study that surveyed Maltese healthcare workers with regard to influenza vaccination showed that the proportion of workers who did not take the vaccine the year before but who are likely to take the vaccine this winter halved from 41% to 21%. Doctors had the highest baseline uptake (23% refused vaccination in 2019) and the highest likely uptake in winter (6% likely to refuse vaccination in 2020).⁹

This study was carried out in order to ascertain the degree of vaccine hesitancy in Maltese healthcare workers *vis-à-vis* a COVID-19 vaccine, and correlate this with influenza vaccination uptake.

METHODS

A short, anonymous questionnaire was sent out to all of Malta's government sector healthcare workers via the service's standard email services. The period for which the questionnaire was open was from 11/09/2020 to 16/09/2020. The questionnaire was

hosted via Google forms and exported to bespoke Excel spreadsheets for analysis.

The questionnaire was sent to all healthcare workers in the main hospital (Mater Dei Hospital), District Primary Care Health Centres, St. Vincent de Paul Long Term Care Facility, Mount Carmel Mental Health hospital, Karin Grech Rehabilitation Hospital and miscellaneous other smaller facilities. It commenced with the following introduction:

Malta has been fortunate to have the EARLY allocation of a COVID-19 vaccine later this year. The vaccine is licensed and approved and will have passed through Phase 3 trials. Priority will be given to front liners and to the vulnerable, followed later by the rest of the population. This is totally anonymous and a very short, public health survey for healthcare workers, please fill completely.

The questions, formatted in tick boxes, covered sex, occupation (medical, nursing, allied profession and other, with the latter including support staff such as in administration, ward clerks, cleaners, etc.), place of work (as above), age bracket, whether the influenza vaccine was taken last winter and whether it would be taken this coming winter (yes/no). The following text was inserted in the questionnaire followed by several questions on a Likert scale of 1-5.

QUICK READ FOR INFORMATION:

Vaccine development is a three-phase process. In Phase I, small groups of people receive the trial vaccine. In Phase II, the vaccine is given to people who have characteristics (such as age and physical health) similar to those for whom the vaccine is intended. In Phase III, the vaccine is given to thousands of people and checked for efficacy and safety. The COVID vaccine that will arrive in Malta will have gone through these Phases and will be approved and licensed.

Based on this information, how likely are you to take the COVID-19 vaccine?

I am concerned as I don't know enough about the vaccine

I am concerned about the short term side effects (e.g. fever etc)

I am concerned about possible long term side effects

I am concerned because I don't think the vaccine will be effective

I am against vaccines in general

For the first question in the list above, it was assumed that scores 1 and 2 were “unlikely”, 4 and 5 were “likely” and a score of 3 was regarded as undecided. For the Likert questions following the first, all were allowed to tick vaccines whatever their likelihood of taking the vaccine.

Chi tests and chi tests for trend were used except for one two by two table with small values wherein a Fischer exact test was used. A p value ≤ 0.05 was taken to represent a statistically significant result.

RESULTS

A total of 9,681 questionnaires were posted electronically, with 1002 (10.4%) responses (table 1).

Influenza vaccination

The proportion of Maltese healthcare workers who will take the influenza vaccine increased significantly across the board when compared to last year irrespective of sex, workplace or occupation (table 2). Doctors had the highest baseline uptake and the highest likely influenza vaccine uptake next winter (table 2).

COVID-19 vaccination

With regard to a COVID-19 vaccine, approximately half of respondents were likely to take the vaccine and a quarter each were undecided or unlikely to take the vaccine. Males were likelier to take the vaccine than females ($\chi^2=13.2$, $p=0.0003$ – table 3). Doctors were also the likeliest group to take the COVID-19 vaccine and when compared against all others this was a highly significant difference ($\chi^2=21.8$, $p<0.0001$ – table 3).

Table 1 Percentage response rates by workplace and occupation

Workplace	Total	Response %	Workplace	Total	Response %
Health Centre	1018	0.9	Medical	1472	13.8
Karin Grech	232	2.2	Nursing	2390	13.3
Mater Dei	5708	16.0	Allied profession	1705	16.1
Mount Carmel	723	1.1	Other	495	41.4
Other	200	30.5			
SVPR	1800	0.2			

Table 2 Percentages who answered “yes” to whether they took influenza vaccine last year (2019) and whether will take vaccine next year (2020), overall and by sex, workplace and profession.

Influenza	Overall	Females	Males	Mater Dei	Rest	Medical	Nursing	Allied profession	Other
Took vaccine %	49	48	51	48	59	67	44	42	57
Will take %	69	68	70	68	80	86	64	67	63
chi	79.5	53.1	27.7	70.9	9.3	18.8	23.9	30.5	1.5
p	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.2

Table 3 Likelihood of taking COVID-19 vaccine overall, by sex and by occupation

	Unlikely%	Undecided%	Likely%		Unlikely%	Undecided%	Likely%
Female	28	27	45	Allied profession	25	23	52
Male	22	14	64	Medical	16	15	69
Total	26	22	52	Nursing	29	29	42
				Other	30	21	49

Both vaccines

An analysis by age showed that there was a significant increase in the likely uptake of the influenza vaccine at all ages (first two columns of table 4 with statistical analysis in next two columns). The COVID-19 likelihood uptake pattern was as described above except for the over 65 age group as none of these fell in the “unlikely to take” category. The proportion of those likelier to take the COVID-19 vaccine was directly related to the likelihood of

their taking the influenza vaccine (table 5: chi=246.2, $p<0.0001$).

COVID-19 vaccine concerns are shown in table 6. The issues raised were only very slightly related to vaccine avoidance in general but more related to insufficient knowledge about such a vaccine and any potential side effects especially those in the long term.

Table 4 Age bracket analysis of influenza vaccine uptake last year, this coming winter and likelihood of COVID-19 vaccine uptake.

Age (y)	Influenza vaccine%		Influenza increase		COVID-19 vaccine acceptance%		
	Took	Will take	chi	p	Unlikely	Undecided	Likely
18-24	33	41	99.3	0.007	25	24	51
25-34	32	41	32.1	<0.001	28	23	49
35-44	34	41	15.8	<0.002	19	24	57
45-54	32	40	17.2	<0.003	31	23	46
55-64	35	41	7.3	0.007	24	18	58
>65	33	45	Fisher	0.2	0	17	83
All	49	69	20.6	<0.001	26	23	52

Table 5 Likelihood of taking flu vaccine (yes/no) by Likert likelihood of taking COVID-19 vaccine.

Unlikely to take COVID vaccine	1	2	3	4	5	Likely to take COVID vaccine
	0.3	0.9	2.1	5.8	8.6	

Table 6 Concerns and misgivings pertaining to a COVID-19 vaccine

Concern%	1	2	3	4	5	n
Insufficient knowledge	6.3	10.7	25.3	23.1	34.7	776
Short term side effects	20.2	18.7	23.9	16.1	21.1	777
Long term side effects	4.9	6.4	14.7	22.5	51.6	783
Vaccine effectiveness	12.7	15.8	40.0	17.6	13.9	765
Generally against vaccines	57.7	16.2	15.0	4.7	6.5	773

DISCUSSION

The increased proportion of Maltese healthcare workers who planned to take the influenza vaccine when compared to the previous year is probably due to increased awareness of respiratory viral illnesses in general in the wake of the COVID-19 pandemic. Interestingly, it is the medical profession who had the highest baseline influenza vaccine uptake and the highest likely influenza vaccine uptake the following winter and this may be due to greater awareness and knowledge of vaccine safety. The same applies for this profession with regard to the COVID-19 vaccine.

The proportions of those who are likely/undecided/unlikely (half, quarter, quarter respectively) to take a COVID-19 are similar to rates reported in other countries.¹⁰ The higher male inclination to take the vaccine may be due to a combination of factors which could include the innate male propensity for perceived risk taking in the face of a novel vaccine.¹¹ The higher likely uptake of a COVID-19 vaccine in the oldest age group is unsurprising as this is the most vulnerable group and therefore most likely, in their own self-interest, to take this vaccine.

Vaccine hesitancy for COVID-19 was similar to that for influenza implying an innate degree of vaccine reluctance/hesitancy and not merely a reluctance based on the concerns discussed below.¹⁰ However, the concerns are, to some extent, valid. There are various types of vaccines in development and these include not only traditional vaccines but also next generation vaccines.⁷

Non-vaccination and vaccine hesitancy

Our findings are unsurprising as the availability of a vaccine does not automatically equate to 100%

aggregate uptake. For example, an H1N1 influenza vaccine in 2009 had a population uptake of 0.4-59% across 22 countries.¹² The low acceptance and uptake of a safe vaccine for a high risk infection is well known and has been dubbed the “pandemic public health paradox”.¹³ This is a strong contributor to vaccine hesitancy and is a tragic public health outcome as vaccines only protect if a sufficient proportion of the population is vaccinated.¹⁴ Non-vaccination has been quite extensively studied and table 7 shows some of the commonest reasons for non-vaccination.¹⁵ One specific example specifically related to this topic is the aforementioned 2009 H1N1 influenza vaccine which was initially claimed to have had associated mortality using the Vaccine Adverse Event Reporting System(VAERS) system which was eventually disproved, but not before undermining public confidence in this important vaccine.¹⁶

In 2019, the World Health Organization named vaccine hesitancy as one of the top ten threats to global health.¹⁷ The reasons for hesitancy are varied and some common vaccine myths and their scientific rebuttals are summarised in table 8.¹⁷

Clearly, the reasons for non-vaccination are complex but misconceptions pertaining to safety predominate. Trends in hesitancy are overall not promising with a recent study showing that vaccine confidence in Europe is low compared to other regions of the world, such as Africa (strongly agreeing with vaccine safety range 19% in Lithuania to 66% in Finland). A drop in confidence trend was linked to political instability and religious extremism, with rogue leaders sometimes promoting natural, unproven and ineffective alternatives to vaccines.¹⁸

Table 7 Commonest reasons for vaccine non-vaccination.¹⁵

'The hesitant' – Those who have concerns about perceived safety issues and are unsure about needs, procedures and timings for immunizing.
'The unconcerned' – Those who consider immunization a low priority and see no real perceived risk of vaccine-preventable diseases.
'The poorly reached' – Those who have limited or difficult access to services, related to social exclusion, poverty and, in the case of more integrated and affluent populations, factors related to convenience.
'The active resisters' – Those for whom personal, cultural, or religious beliefs discourage them from vaccinating.

Table 8 Common vaccine myths and the misconceptions on which they are actually unfounded.¹⁷

Common vaccine myths	Key concepts
Too many vaccines too soon.	The number of immunologic components in vaccines have declined over time. The current 14 vaccines on the United States schedule contain 200 immunologic proteins in total, the smallpox vaccine contained 160.
Too many vaccines can “overwhelm” the immune system.	Epidemiologic data and biologic data show that cumulative increases in the number of vaccines have no effect on immune function.
MMR vaccine causes autism.	Original study making this claim contained 12 children, the paper was subsequently retracted due to evidence of misrepresented data. Multiple large scale studies, including a study of half a million children have shown no association between receipt of MMR and risk of autism.
HPV vaccine increases risk of autoimmune disease.	More than 270 million doses of HPV vaccine have been administered. Repeated well-designed studies show no association between HPV and AI disease.
Influenza vaccine given in early pregnancy increases risk of miscarriage.	A study of 2762 women showed no association between influenza vaccine and spontaneous abortion.

COVID-19 vaccine hesitancy

A representative sample of circa 1000 adults in the US questioned from 16-20 April 2020 with regard to a putative COVID-19 vaccine replied: 57.6% intended to be vaccinated, 31.6% were uncertain and 10.8% did not intend to be vaccinated. Factors independently associated with vaccine hesitancy ("no"/"not sure") included younger age, Black race, lower educational attainment, and not having received the influenza vaccine in the prior year. Reasons specified for vaccine hesitancy included vaccine-specific concerns, a need for more information, antivaccine attitudes or beliefs, and a lack of trust.¹⁰

Overcoming hesitancy

WHO advises a pre-emptive pro-vaccination strategy that psychologically impacts populations so

as to maximize uptake when vaccines become available.¹⁹ In the case of COVID-19, national vaccination strategies must be in place in advance of vaccine availability so as to have a plan for population prioritisation for vaccination and to reduce the incidence of fear/concern *vis-à-vis* vaccination.²⁰ A crucial part of the latter aspect is the countering of fake news and misinformation that already percolates (especially via social media) in this regard.²⁰ Suggested key guidelines/milestones are shown in table 9.²⁰ Segmentation of target populations is vital and consists of the identification of groups who share similar beliefs/attitudes/behavioural patterns. This goes beyond easily pigeonholed fields such demographic/epidemiological data and greatly enables public health planners to shape intervention/s to specific segment/s.²⁰

Table 9 Key guidelines for developing a proactive COVID-19 pro-vaccination strategy.²⁴

Key Guidelines	Guidelines		
	Not completed	Underway	Completed
Behavior change planning			
Audience targeting and segmentation			
Competition and barrier analysis and action			
Mobilization			
Vaccine demand building			
Community engagement			
Vaccine access			
Marketing promotions strategy			
News media relations and outreach			
Digital media strategy			

Healthcare workers

Hesitancy already exists among healthcare workers with regard to ordinary vaccines, such as seasonal influenza vaccination,²²⁻⁴ and COVID-19 vaccine hesitancy among healthcare workers will not be different.²⁵⁻⁶ Hesitancy is fuelled by social media, conspiracy theories and fake news, a topic about which entire volumes have been written.²⁷⁻⁸

Public Health and healthcare worker employers must do their best to ensure that the proportion of vaccinated workers is as close to totality as possible. Clinicians, legislators and even ethicists are increasingly cognisant of this aspect of healthcare, and are progressively mandating seasonal influenza vaccination for healthcare workers in some countries. This is not being envisaged for Malta. The Society for Healthcare Epidemiology has recommended that annual influenza vaccination should be a condition of employment for healthcare workers,²⁹ a stance endorsed almost universally by professional bodies.⁵ Indeed, ethicists have averred that:

“given the mounting evidence for the efficacy of influenza vaccination in infection control [...] the provision of health care by non-vaccinated health care workers is not merely suboptimal health care, but it is also at variance with generally accepted principles of health care ethics.”⁵

This is because medical ethics upholds the dual principles of beneficence and non-maleficence. The former infers the promotion of patients' well-being and the latter is *primum non nocere*. Therefore “practicing without vaccination is maleficent because it falls below the standard of medical care”.⁵ It has in fact been shown that influenza vaccination of healthcare workers reduces influenza morbidity and mortality in influenza-vulnerable populations.³⁰⁻³³

The commonest reason for healthcare worker vaccination hesitancy is insufficient knowledge about its safety profile and irrational apprehension and it has been shown that improved information about the vaccine improves voluntary vaccine uptake.³⁴ Our study partially supports this contention in that doctors were more likely to take the influenza vaccine, both last year and with even greater likelihood next winter, and this may be due to greater knowledge in this group of healthcare workers than in the other groups i.e. allied health professionals, nurses and others.

CONCLUSIONS

Healthcare workers should be informed about and encouraged to take influenza vaccination. The introduction of a COVID-19 vaccination “passport” may also be considered especially if it provides added benefit/s to the vaccinee.

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